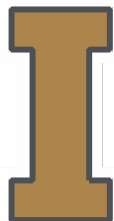


# Data Acquisition System for Synchronous Generator Transient Performance

Sponsor:



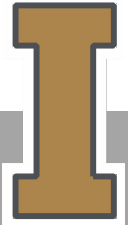
SCHWEITZER  
ENGINEERING  
LABORATORIES



University of Idaho  
College of Engineering

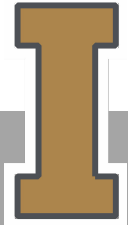
# Agenda

- Project Goal and Specifications
- Project Topology
- Project Progress
- Plan of completion
- Project Budget



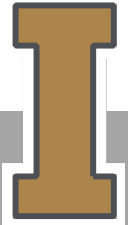
# Project Goal

Design and implement a system to acquire measurements from a synchronous generator in transient conditions

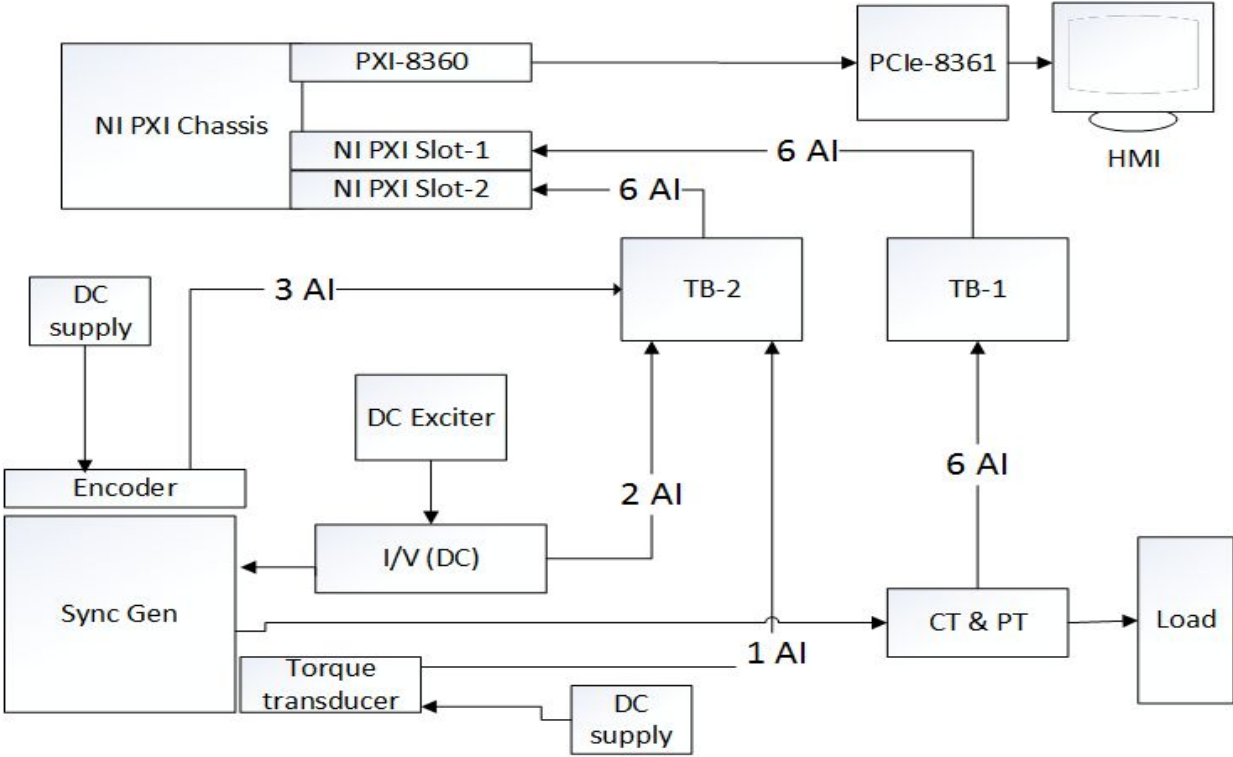


# Measurement Requirements

- Terminal Voltage and Current
- Field Voltage and Current
- Torque
- Power
- Speed
- Frequency
- Load Phase Angle

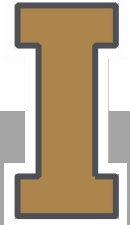


# Project Topology

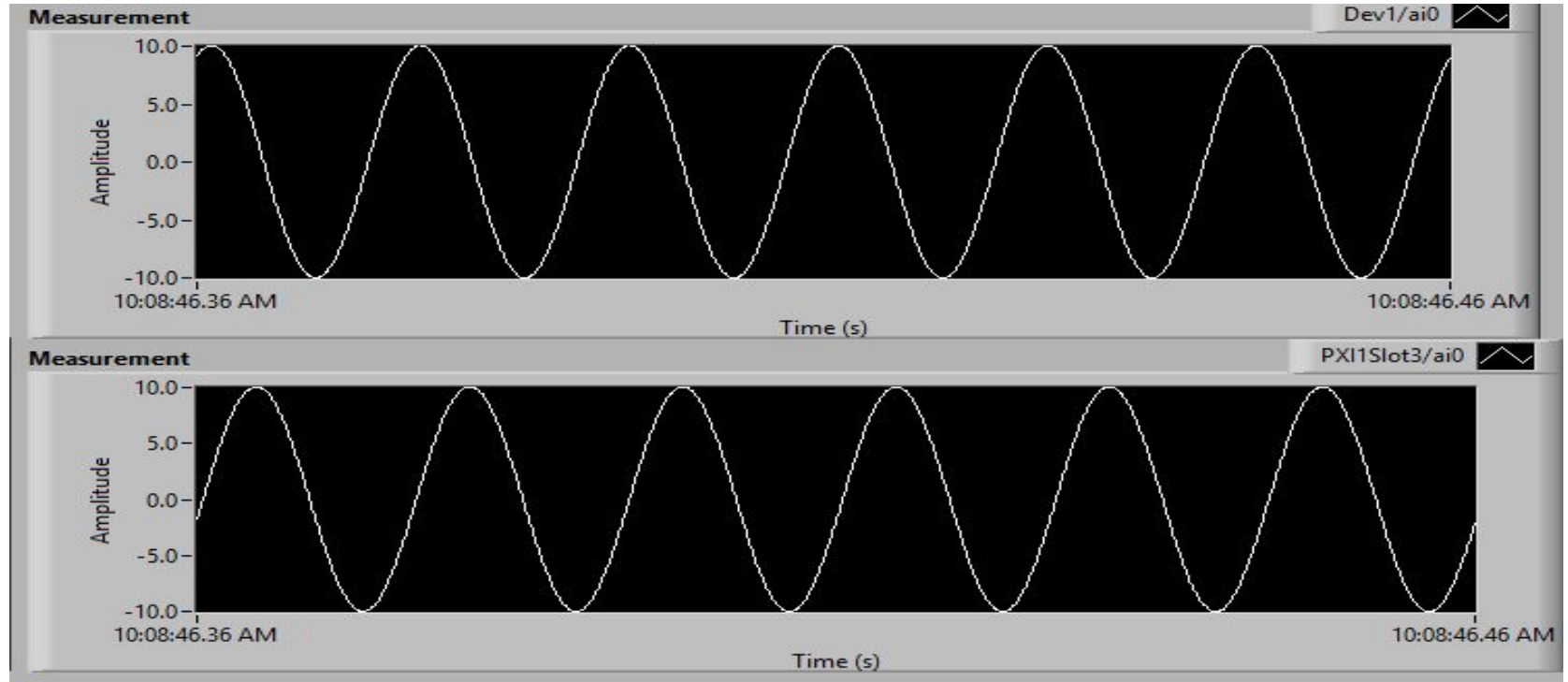


# Project Progress

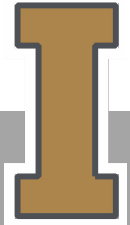
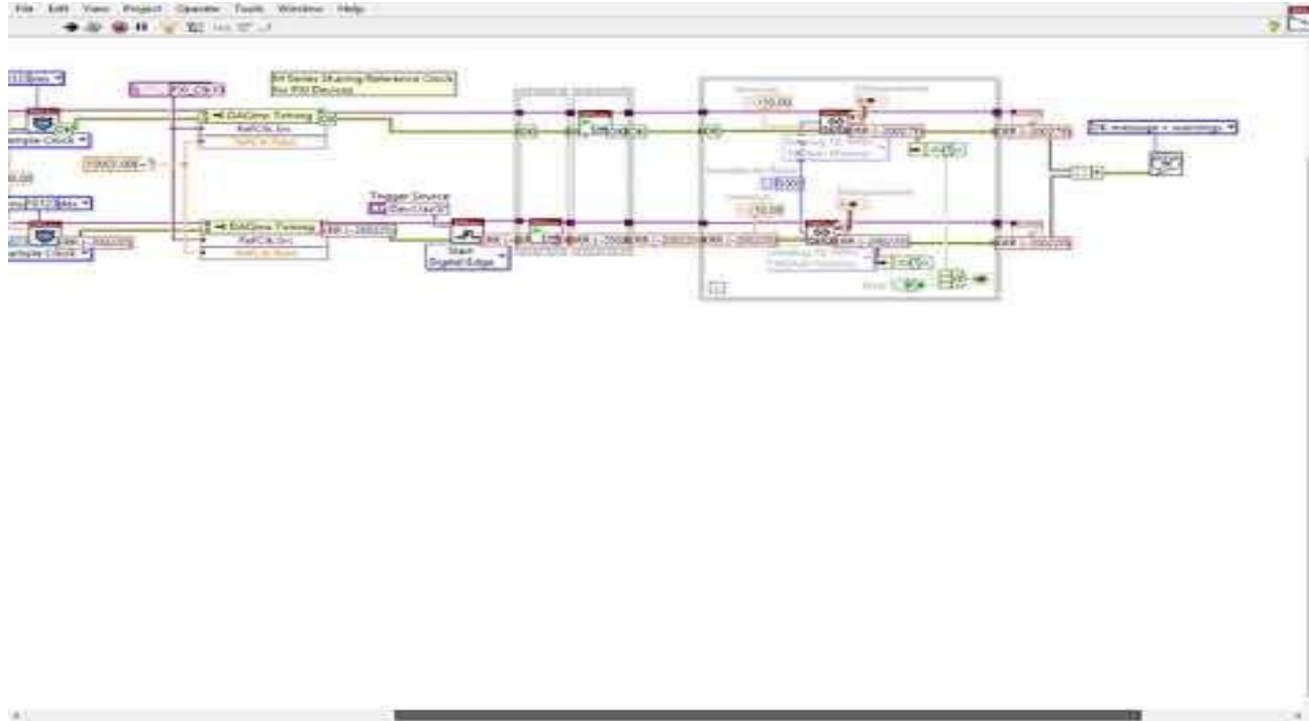
- DAQ Synchronization
- Torque Transducer Testing
- Transformers Final Decision



# DAQ Asynchronization

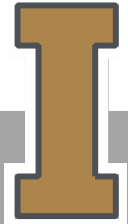
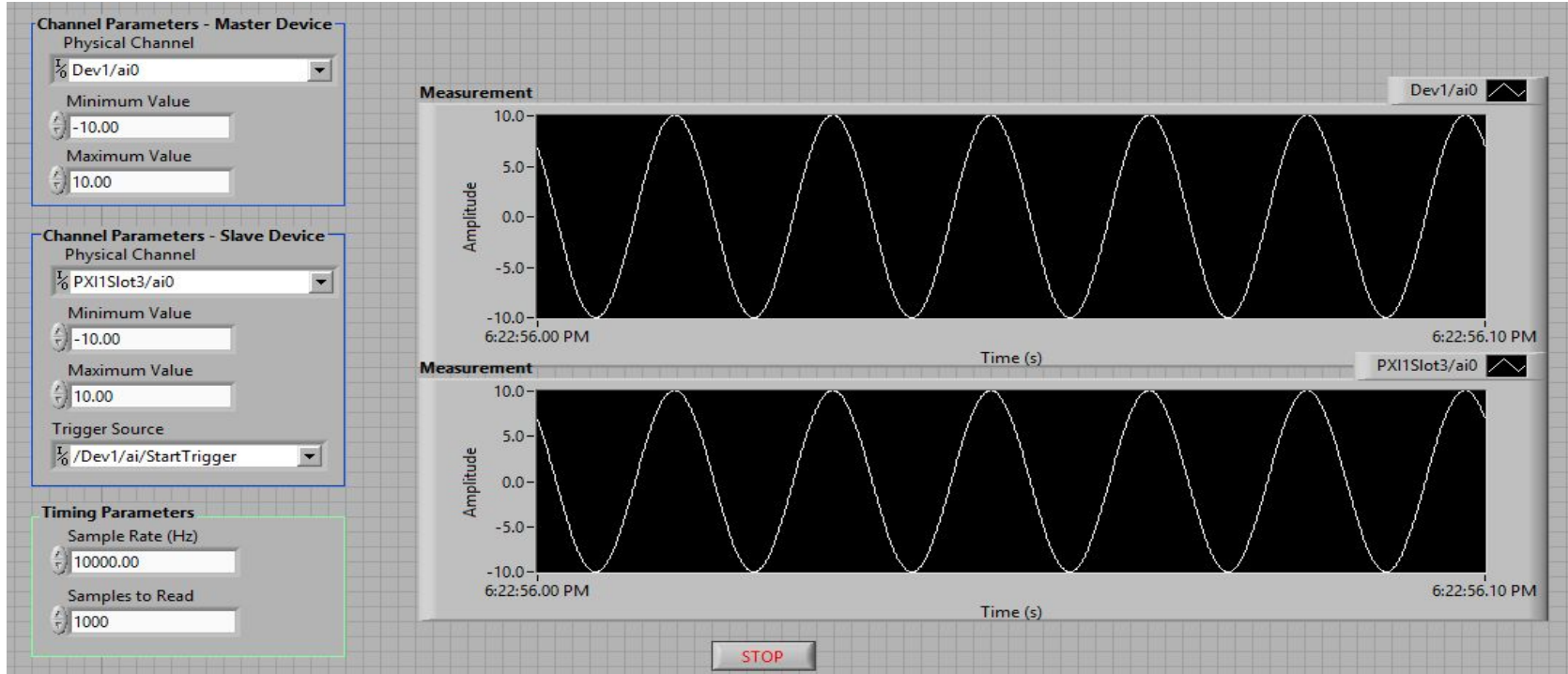


# Block Diagram

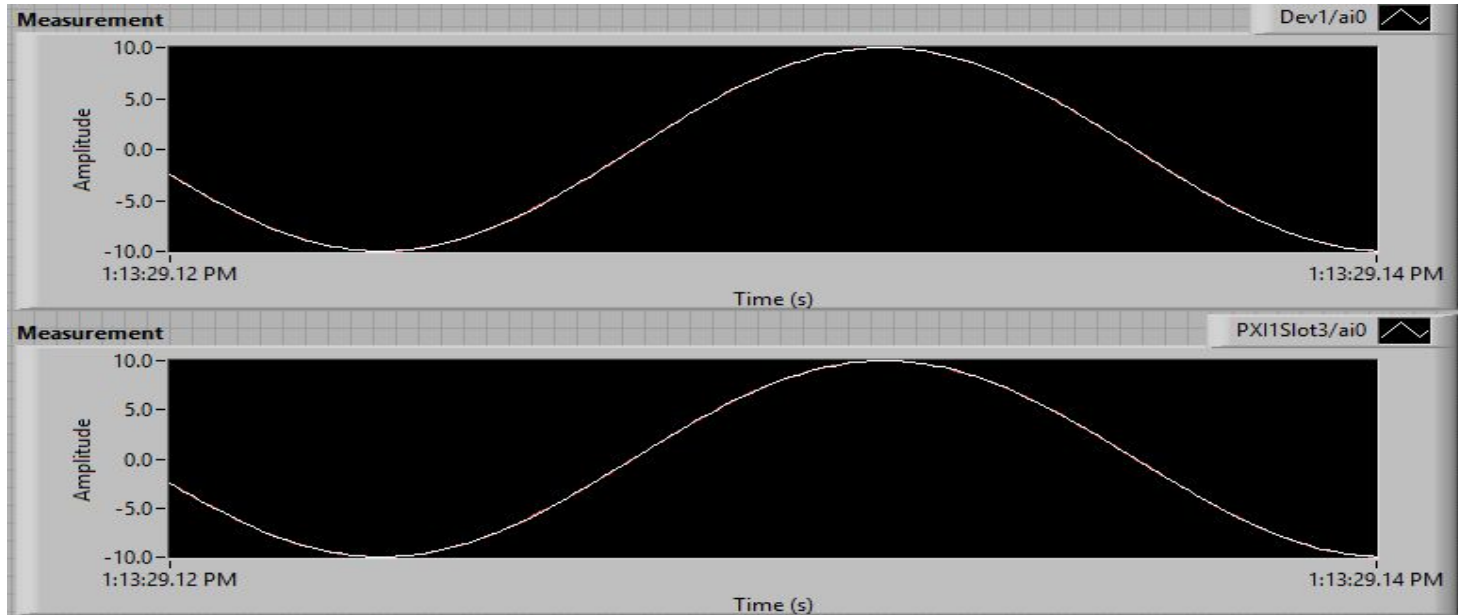




# Run Timre



# Multi-channels

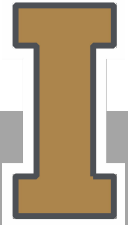


# Instrument Transformer

Generator rating voltage: 220V

Generator rating current: 35.4A

Input range of data acquisition device: -10V to 10V



# Current Transformer

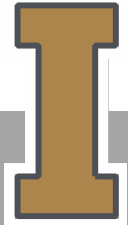
Model 2241

Primary: (10/15/30)/50/100/250/(300)...A on one device

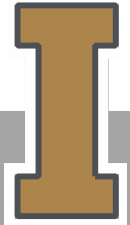
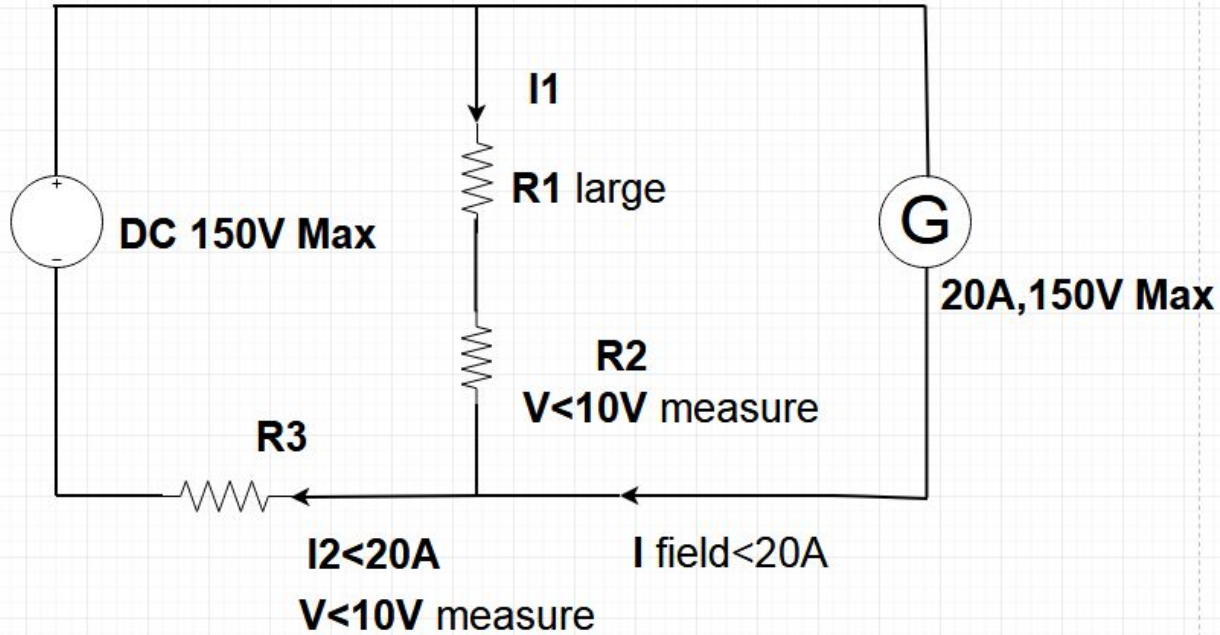
Secondary: 5A

Accuracy: 0.2%

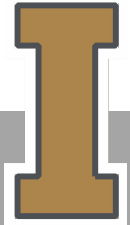
Rated load: 15VA



# Field current and Field voltage



# Torque Transducer

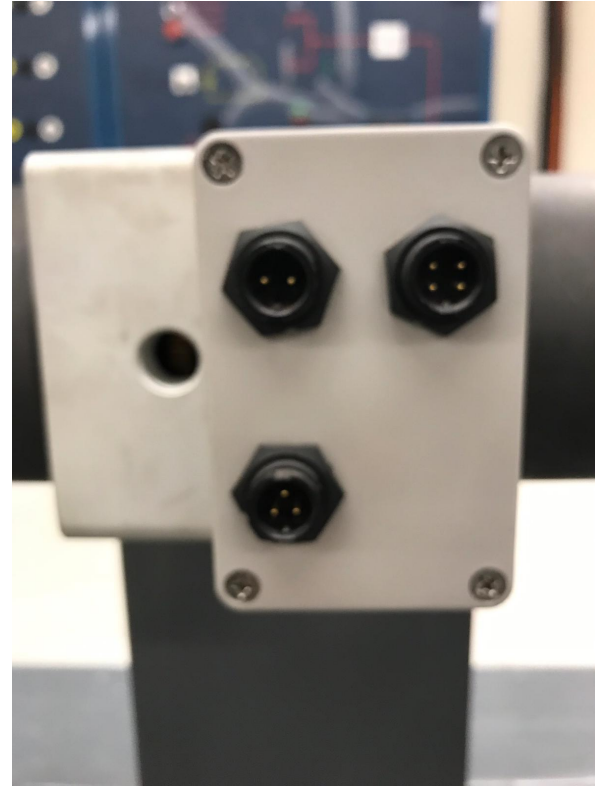


# Connections

2 pin: DC Power

3 pin: Serial RS232

4 pin: Analogue

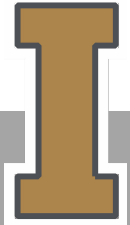
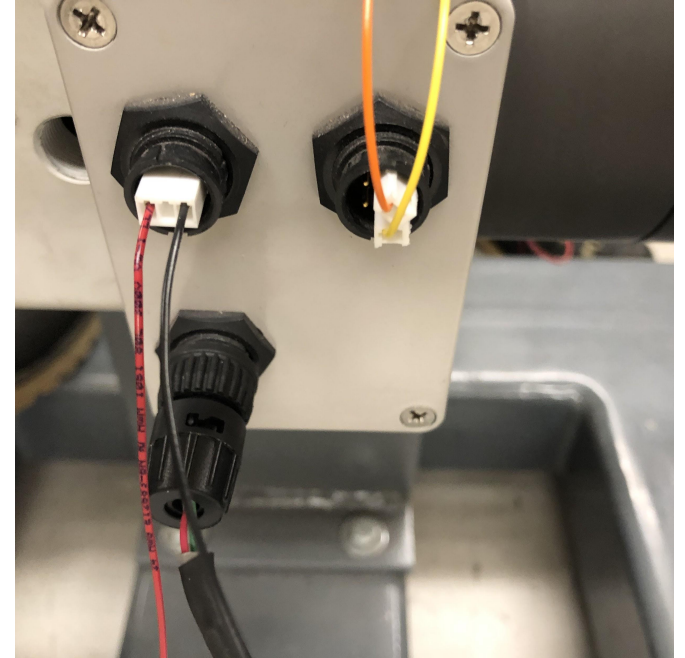


# Cables

2 pin: \$80

3 pin: Own

4 pin: \$100

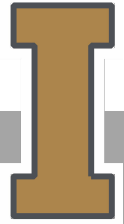
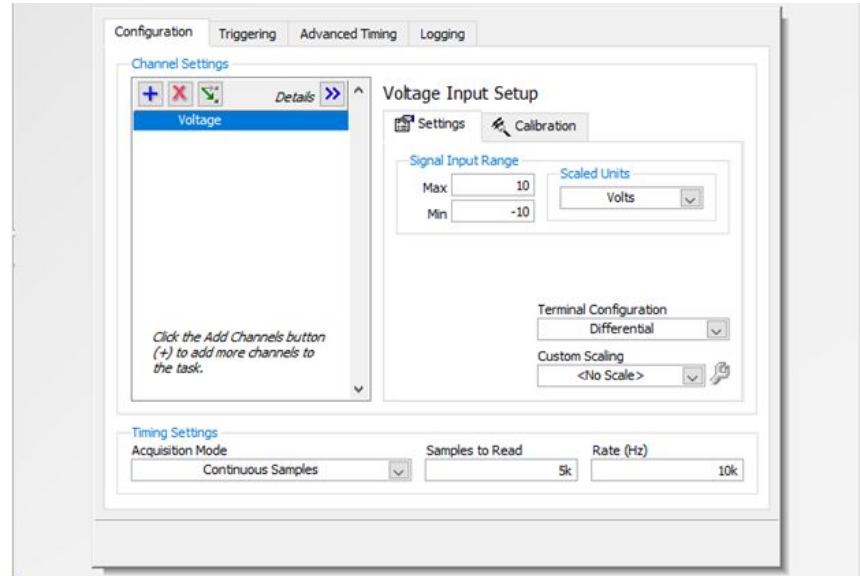




# Analog Torque Signals

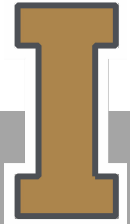
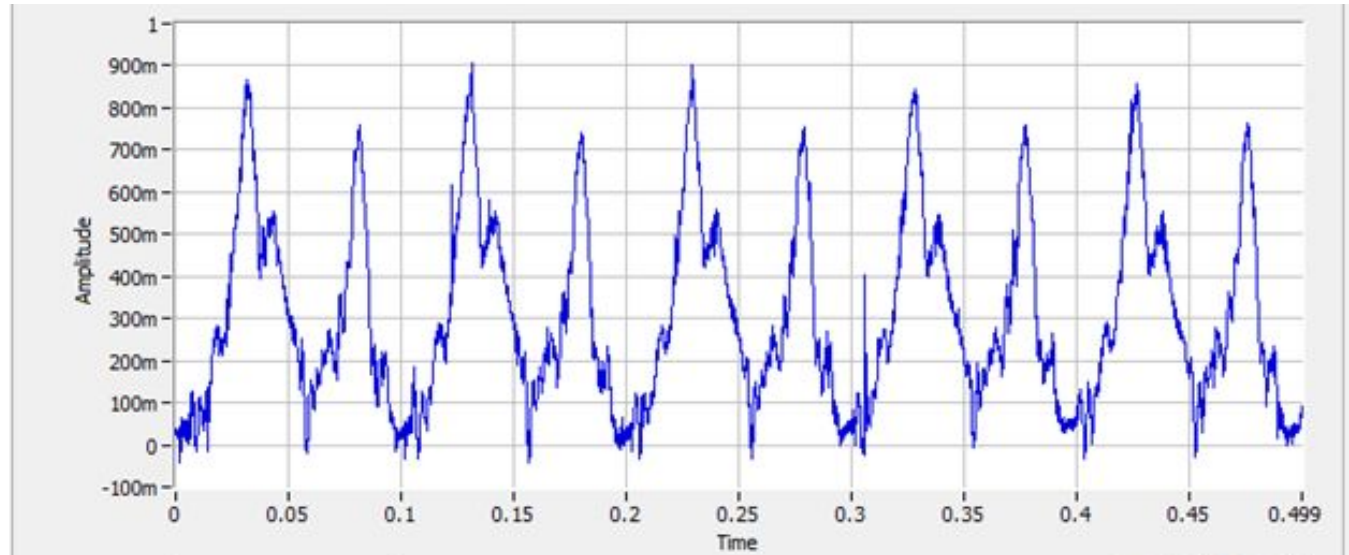
10 kHz Sample Rate

5k Samples



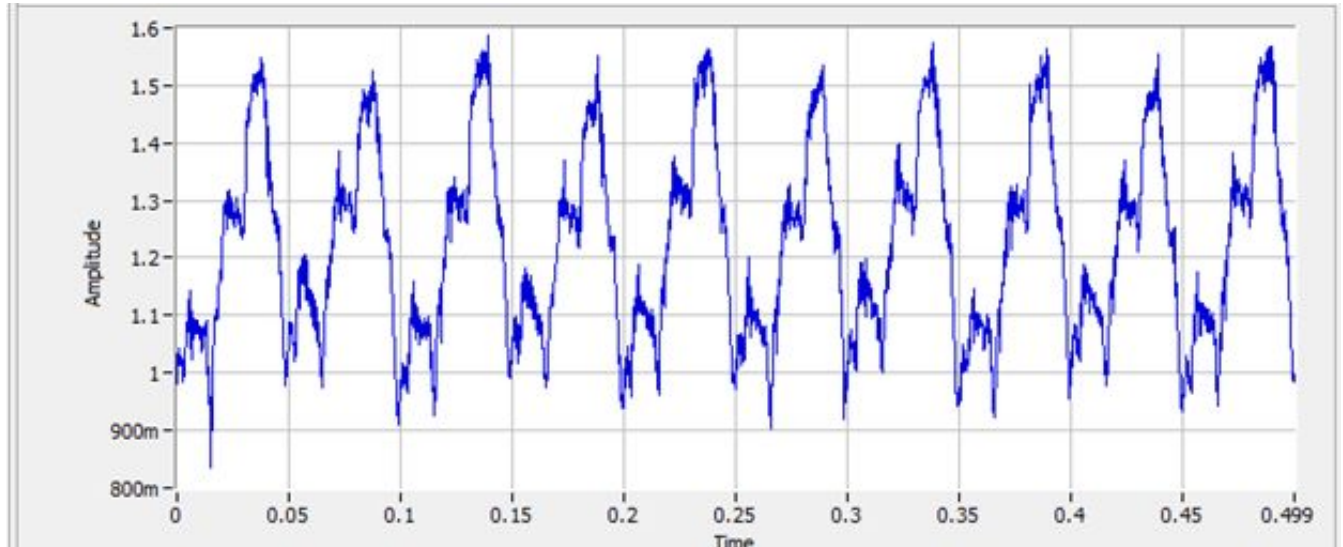
# Analog Torque Signals

No Load



# Analog Torque Signals

37 $\Omega$  Load



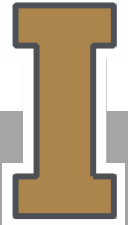
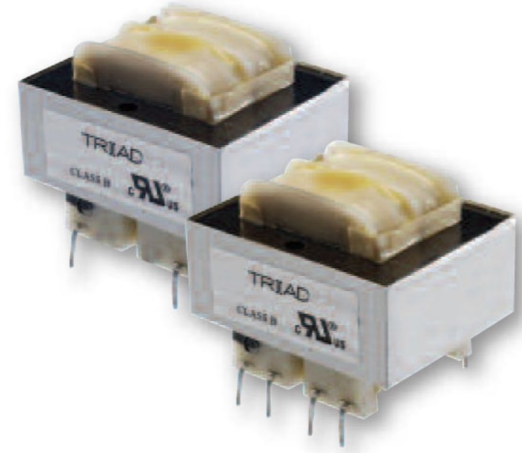
# Potential Transformer

Model: FS

Primary voltage: 230V

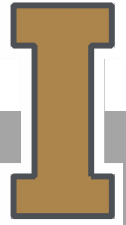
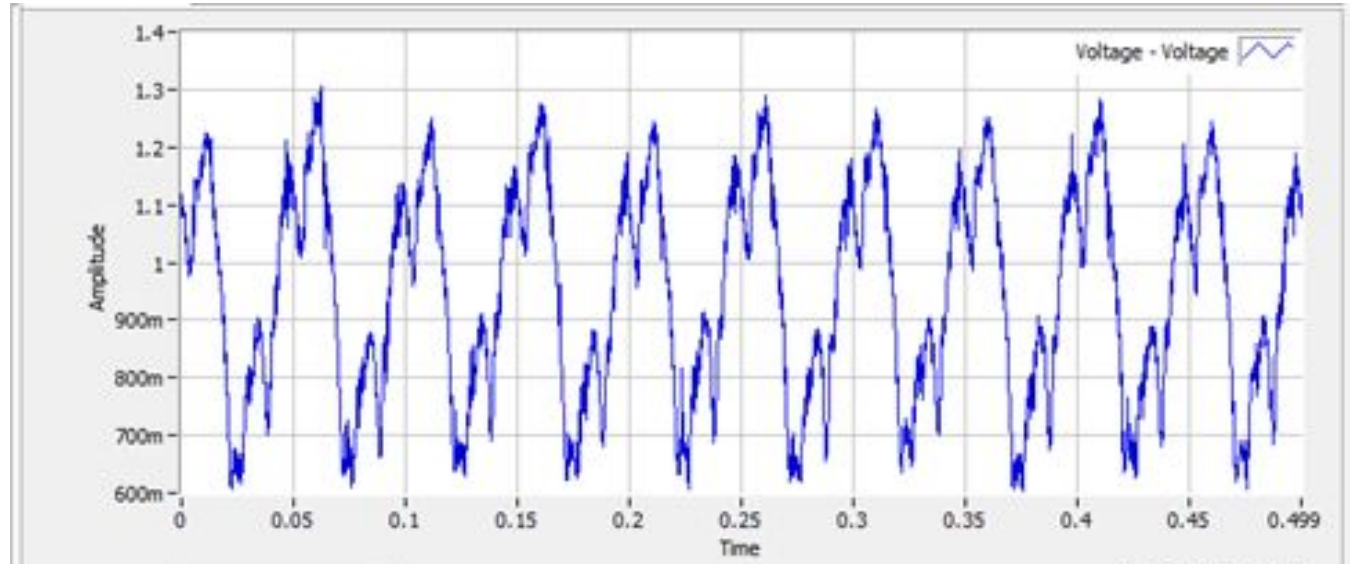
Secondary voltage: 5/6/8/10/12/16/20...V

Maximum rated load: 1.1/2.5/6/12/20/36VA  
with different type of same model



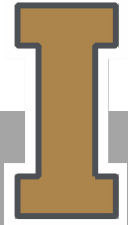
# Analog Torque Signals

53Ω Load

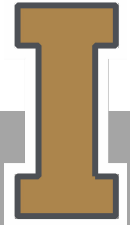
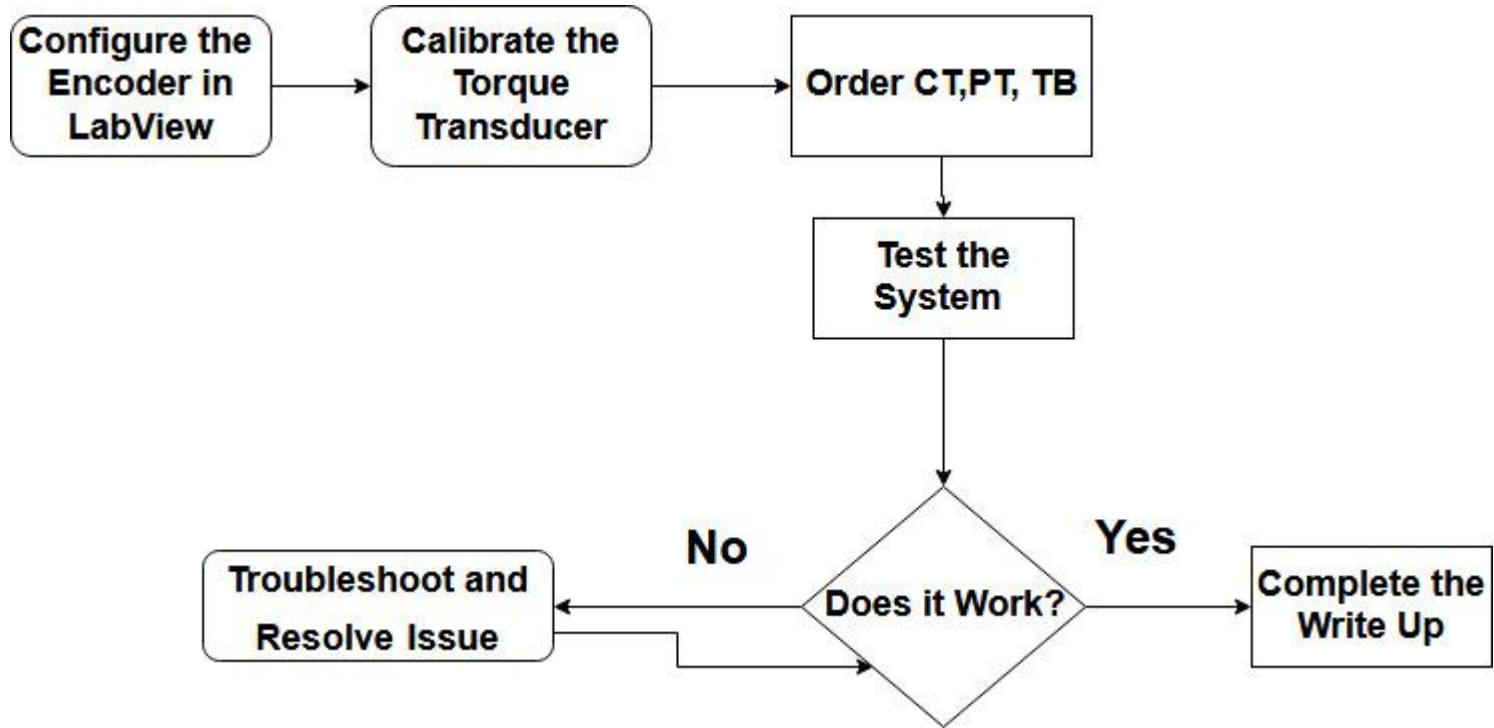


# Dates & Goals

- 2/22 - Encoder Measurement
- 2/18 - Order project items
- 3/6 - Snapshot 3
- 3/10 - Calibrate Torque Transducer
- 4/20 - Project Validation
- 4/27 - Design Expo
- 5/4 - Final Deliverables



# Plan of Completion



# Budget

Capstone Project Budget - Fall/Spring												
Project:SEL- Data Acquisition System for Synchronous Generator Transient Performance												
Last Updated <b>2/14/2019</b>												
Expense Items	2018								Item			
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total			
Equipment/Tools:												
										\$ -		
Devices:										\$ 916		
TB 2706*2						\$ 636						
CT&PT						\$ 100						
Cable1(2 pin: DC Power)						\$ 80						
Cable2(4 pin: Analogue )						\$ 100				\$ 100		
Extra Hardware	\$ -	\$ -	\$ -			\$ 500				\$ 500		
Poster							\$ 100			\$ 100		
										\$ -		
												Expenses
										\$ 1,616		Subtotal
									Totals	\$ 1,616	\$ 4,000	\$ 2,384
											Budget	Excess





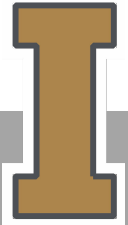
# Appendix

PCIe 8360- Sustained throughput

110 MB/s

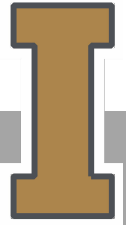
PXI 8361 Sustained throughput

100 MB/s



# TB 2706

- Cost \$ 318



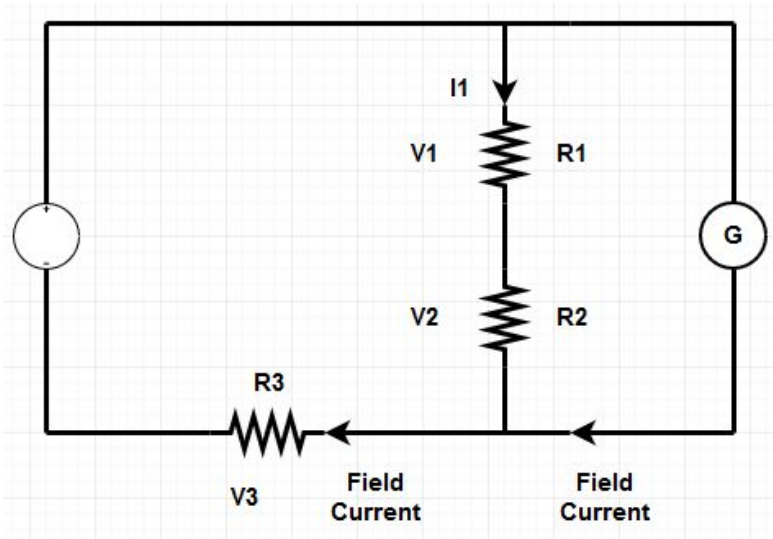
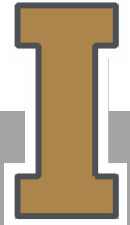


Fig 3



— Terminal A Voltage  
- - - Terminal B Voltage  
- - - Terminal C Voltage

